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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/695,843	10/29/2003	Jimmy D. Collins	FSI0052/US/2	7839
7590	03/16/2005		EXAMINER LEE, HSIEN MING	
Daniel C. Schulte Kagan Binder, PLLC Maple Island Building 221 Main Street North, Suite 200 Stillwater, MN 55082			ART UNIT 2823	PAPER NUMBER

DATE MAILED: 03/16/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/695,843

Applicant(s)

COLLINS ET AL.

Examiner

Hsien-ming Lee

Art Unit

2823

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☐ Responsive to communication(s) filed on ____.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-15 and 24-27 is/are pending in the application.
- 4a) Of the above claim(s) ____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) ____ is/are allowed.
- 6) ☒ Claim(s) 1-15 and 24-27 is/are rejected.
- 7) ☐ Claim(s) ____ is/are objected to.
- 8) ☐ Claim(s) ____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on ____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. ____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

HSIEN-MING LEE
PRIMARY EXAMINER

Attachment(s)

- 1) ☐ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)

Paper No(s)/Mail Date 02/804 & 030804

- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. ____
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: ____

DETAILED ACTION

Claim Rejections - 35 USC § 102

1. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

2. Claims 1, 3-6, 8-13, 15 and 24-27 are rejected under 35 U.S.C. 102(e) as being anticipated by Kitano et al. (US 6,383,948, submitted by applicant).

In re claim 1, Kitano et al., in Fig.19 and related text, teach a spin-coating system comprising a supply of process solution in fluid (i.e. resist liquid) communication with a dispenser 102a through a dispense line 121, and a pressure sensor 124 that measures pressure of the process solution in the dispense line 121 at a time related to a step of dispensing the process solution, to control timing of a subsequent spin-coating process step.

In re claim 3, Kitano et al., in Fig.19, teach that a dispense valve 122a is between the supply of process solution 123 and the dispenser 102a, and the pressure sensor 124 is between the dispense valve 122a and the dispenser 102a.

In re claim 4, Kitano et al., in Fig.19 and related text (col. 19, lines 5-14), teach that the pressure sensor 124 detects a beginning or end of process solution being dispensed from the dispenser 102a.

In re claim 5, Kitano et al. teach comprising a control system (i.e. a control section, such as 86 in Fig.16 or 240 in Fig.28 and related text on col. 4, lines 44-65, col. 26, lines 31-38 and

Art Unit: 2823

42-49 and col. 30, lines 3-13) for controlling a spin coating process, wherein the pressure sensor 124 detects a beginning or end of process solution being dispensed from the dispenser 102a and the pressure sensor send a signal to the control system at a detected beginning or at a detected end of the process solution dispense.

In re claims 6, 8, Kitano et al. teach that the solution is a photoresist solution (i.e. resist liquid, col. 3, lines 52-53), and the pressure sensor signals the control system at a detected end of the process solution dispense.

In re claim 9, Kitano et al. teach a spin-coating system comprising:

- a turntable 112 to support and rotate a substrate W (Fig.19);
- a dispenser 102a moveable between a dispensing position and a non-dispensing position;
- a supply of process solution 123 in fluid communication with the dispenser 102a through a dispense line 121;
- a pressure sensor 124 that measures pressure of the process solution; and
- a process control system (i.e. a control section, such as 86 in Fig.16 or 240 in Fig.28 and related text on col. 4, lines 44-65, col. 26, lines 31-38 and 42-49 and col. 30, lines 3-13) that controls application of the process solution to the substrate W, the process control system being programmed to interrupt serial control to execute a process command.

In re claim 10, Kitano et al. teach that the system comprises a dispense valve 122a between the supply of process solution 123 and the dispenser 102a (Fig.19), the pressure sensor 124

Art Unit: 2823

measures pressure of the process solution in the dispense line 121, the pressure sensor 124 is between the dispense valve 122a and the dispenser 102a.

In re claims 11 and 15, Kitano et al. teach that the solution is a photoresist solution (i.e. resist liquid, col. 3, lines 52-53).

In re claim 12, Kitano et al. teach that the pressure sensor 124 sends a signal to the control system at the beginning or at the end of dispense of the process solution, and the control system interrupts control of process (col. 4, lines 44-65, col. 26, lines 31-38 and 42-49 and col. 30, lines 3-13).

In re claim 13, Kitano et al. also teach the claimed limitations, as stated in the rejection against claims 11 and 12.

In re claims 24-25, Kitano et al. also teach a spin-coating system comprising a supply of process solution in fluid (i.e. resist liquid) communication with a dispenser 102a through a dispense line 121 and a pressure sensor 124 that measures pressure of the process solution to detect an equipment malfunction in the apparatus, such as pressure variation result from the malfunction of a pump 122 (Fig.19).

In re claim 26, Kitano et al. also teach that the system detects a malfunction by measuring pressure of process solution via the pressure sensor 124 in the dispense line 121 during dispense of the process solution.

In re claim 27, Kitano et al. teach that the solution is a photoresist solution (i.e. resist liquid, col. 3, lines 52-53).

Claim Rejections - 35 USC § 103

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

4. Claims 2, 7 and 14 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kitano et al. (US '948) in view of McKias (US 2003/0075555, submitted by applicant).

In re claim 2, Kitano et al. do not teach that the pressure sensor comprises a pressure transducer.

However, the pressure transducer has been used as the pressure sensor for controlling fluid pressure in the spin coating apparatus, as evidenced by McKias (paragraph [0023]).

Therefore, it would have been obvious to one of the ordinary skill in the art, at the time of the invention was made, to use the pressure transducer, as taught by McKias, for the pressure sensor of Kitano et al., since the pressure transducer is a good means for measuring and controlling the fluid pressure in the spin coating apparatus.

In re claims 7 and 14, Kitano et al. do not teach that the process solution is a developer solution and the control pressure sensor signals the control system at a detected start of developer solution dispense.

McKias, in an analogous art, teaches supplying a process solution (i.e. either the photoresist solution or developer solution) in fluid communication with a dispense head and a pressure sensor (i.e. pressure transducer) for measuring the fluid pressure in the dispense line (Fig.1 and paragraphs [0023] and [0025]).

Art Unit: 2823

Therefore, it would have been obvious to one of the ordinary skill in the art, at the time the invention was made, to apply the teachings of Kitano et al. at an apparatus where the process solution is developer instead of photoresist as suggested by McKias for the reasonable expectation of success, i.e. using the pressure sensor with the control system of Kitano et al. to measure the developer solution pressure in the dispense line and thus to control the developer solution volume and pressure during transporting the developer solution from the dispense supply to the dispense without departing the spirit and the scope of Kitano et al..

5. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Hsien-ming Lee whose telephone number is 571-272-1863. The examiner can normally be reached on Tuesday-Thursday (8:00 ~ 6:00).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Olik Chaudhuri can be reached on 571-272-1855. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

March 10, 2005

Hsien-ming Lee
Primary Examiner
Art Unit 2823

HSIEN-MING LEE
PRIMARY EXAMINER

Lee
3/10/2005